Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Cancelled)

2. (New) An immersion lens system for focusing a primary particle beam and moving the focused primary particle beam on a specimen to be examined and collecting a plurality of secondary electrons and back-scattered electrons generated by the primary beam colliding with the specimen, the system comprising:

a lens adapted to generate a magnetic field in a vicinity of the specimen to focus the particles of the particle beam on the specimen, the lens having a central bore through which the particle beam travels;

an annular detection unit within the central bore and located within a vicinity of where the primary particle beam enters the central bore; and

an aperture within the annular detection unit, the aperture being characterized by a size ranging from about 0.3 mm to 2 mm in diameter.

3. (New) An objective lens system as recited in claim 2, further comprising an electrode having a potential adapted to provide a retarding field to the particle beam near and at the specimen to reduce an energy of the particle beam when the particle b3eam collides with the specimen; and

a deflection system including at least one deflection unit along a beam axis for deflecting the particle beam to allow scanning of the specimen, at least one deflection unit located either in a retarding field of the beam or located within the central bore of the lens.

4. (New) An objective lens system as recited in claim 3, wherein the deflection unit has an aperture larger than the aperture of the annular detection unit.

5. (New) An objective lens system as recited in claim 2, wherein the lens is an electrostatic lens.

6. (New) An objective lens system as recited in claim 2, wherein the lens is a magnetic lens.

7. (New) An objective lens system as recited in claim 2,

wherein the primary particle beam is an electron beam; and

further comprising a detection unit for collecting back-scattered electrons and secondary electrons generated by the primary beam colliding with the specimen, the detection unit positioned to capture the back-scattered electron and secondary electrons traveling along the beam axis in a direction opposite to the primary beam.

8. (New) An objective lens system as recited in claim 2, wherein the primary particle beam is an electron beam.

9. (New) An objective lens system as recited in claim 2, wherein the magnetic lens is a side-pole magnetic lens.

10. (New) An objective lens system as recited in claim 2, wherein the central bore of said magnetic lens is axially symmetric about the beam axis.

11. (New) An objective lens system as recited in claim 2,

wherein the deflection system comprises a plurality of deflection units, the at least one deflection unit being among the plurality of deflection units;

wherein a first group of the plurality of deflection units deflects the particle beam to position the beam at a starting position over an area to be scanned, and

wherein a second group of the plurality of deflection units moves the particle beam in a scanning motion over the area so that an image of the area can be constructed.

12. (New) An objective lens system as recited in claim 11, wherein the first group of deflection units deflects the particle beam to a starting position with a speed that is slow relative to the scanning speed of the beam.

13. (New) An objective lens system as recited in claim 11, wherein the deflection unit positioned in the retarding field is included in the first group of deflection units.

14. (New) An objective lens system as recited in claim 2, wherein the deflection unit located within the central bore of the magnetic lens is maintained at an average potential higher than the source of the particle beam source to maintain the energy of the particle beam while the beam travels through the central bore.

15. (New) An objective lens system as recited in claim 14, wherein the particle beam source is maintained at negative potential.

16. (New) An objective lens system as recited in claim 15, wherein the negative potential of the particle beam source is about -12 Kv.

17. (New) An objective lens system as recited in claim 15, wherein the negative potential of the particle beam source is varied within a range of about -2 Kv to -35 Kv.

18. (New) An objective lens system as recited in claim 2,

wherein the specimen has a positive potential relative to a source potential of the particle beam;

wherein the at least one deflection unit located in the retarding field is maintained at an average potential that is at least negative or positive relative to the potential of the specimen.

19. (New) An objective lens system as recited in claim 18, wherein the positive potential of the specimen is in the range of about 100 V to 10KV related to the potential of the particle beam source.

20. (New) An objeotive lens system as recited in claim 18, wherein the average potential of the deflection unit is in the range of about 1000 V to -3000 V relative to the potential of the specimen.

21. (New) An objective lens system as recited in claim 2,

wherein a deflection unit has an aperture through which the primary beam passes; and wherein the deflection unit has a voltage strength (Ed) across the aperture and a deflection distance (r(z)) that meets a first order swinging objective retarding immersion lens criteria:

Ed=k[1/2B'(z)r(z)+B(z)r(z)/z]+1/2.phi."(z)r(z)+.phi.'(z)r(z)/z

wherein Ed is the electric field strength within the deflection unit and orthogonal to the optical axis (Z-axis) to produce a given deflection, r(z) is the radial deflection distance from the Z-axis as a function of distance along the axis, B(z) is the magnetic flux density along the optical axis of the lens, .phi.(z) is the electrical potential on the optical axis, .phi.'(z) is the first order differentiation with respect to z, .phi."(z) is the second order differentiation with respect to z, B'(z) is the first order differentiation with respect to z, and k is a constant to perform the required units conversion.

22. (New) An objective lens system as recited in claim 21, wherein the deflection unit has a voltage strength and deflection distance which are optimized to substantially reduce third order and fifth order aberrations.

23. (New) An objective lens system as recited in claim 2,

wherein the central bore of the magnetic lens has a bucket-shape and

wherein the deflection units located within the central magnetic lens near the top of the bucket have a larger diameter and near the bottom of the bucket a smaller diameter.

24. (New) An objective lens system as recited in claim 2, wherein the central bore of the magnetic lens has a beam-defining aperture at a point where the primary particle beam enters the central bore and a lens aperture at a point where the primary particle beam exits the central bore of the magnetic lens.

25. (New) An objective lens system as recited in claim 2, wherein the deflection unit is an electrostatic deflection unit.

26. (New) An objective lens system as recited in claim 2,

wherein the deflection unit includes:

a plurality of conducting segments, each segment being insulated from the others and

substrate for supporting the conducting segments, the substrate having a hole surrounded by the conducting segments and through which the primary particle beam passes; and

wherein a voltage is applied to at least two of the segments to deflect the particle beam traveling through the deflection units.

27. (New) An objective lens system as recited in claim 22,

wherein the deflection unit includes twelve conducting segments arranged in four groups of three segments each; and

wherein a separate voltage is applied to each of the four groups of segments to deflect the primary particle beam.

28. (New) An objective lens system as recited in claim 23, wherein two of the four groups deflect the primary particle beam in the X direction and wherein the other two of the four groups deflect the primary beam in the Y direction.

29. (New) An objective lens system as recited in claim 24, wherein the X-direction and Y-direction groups are driven differentially.